Satellite Data for OCONUS Applications

Gary Jedlovec

NASA's Short-term Prediction Research and Transition (SPoRT) Project

Town Hall Meeting: *Advances in OCONUS Satellite Applications Enabled by the Current and New Generation of Polar-orbiting and Geostationary Environmental Satellites*

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Dr. Gary Jedlovec

- B.S. (1979) and M.S. (1981) – Meteorology, Saint Louis University
- Ph.D. (1987) – Meteorology, minor in Remote Sensing, UW Madison

Joined ***NASA MSFC*** in Huntsville, AL in 1985 as an ***atmospheric scientist***.

Dr. Jedlovec also holds an ***adjunct professor*** position with the ***University of Alabama in Huntsville***, where he teaches and mentors graduate students in atmospheric sciences.

Last 30 years developing and evaluating algorithms to retrieve geophysical parameters from remotely sensed aircraft and satellite measurements for regional climate studies, weather forecasting, and disaster applications.

Dr. Jedlovec leads an effort to transition the use of unique NASA and NOAA satellite data into operational weather community as part of the ***SPoRT program to demonstrate the utility of data to improve short term weather forecasts, with recent emphasis on products to OCONUS***

Recently, SPoRT has also project has focused on using satellite data to detect and monitor natural disasters, providing valuable information to the USGS, FEMA, and other disaster response agencies.

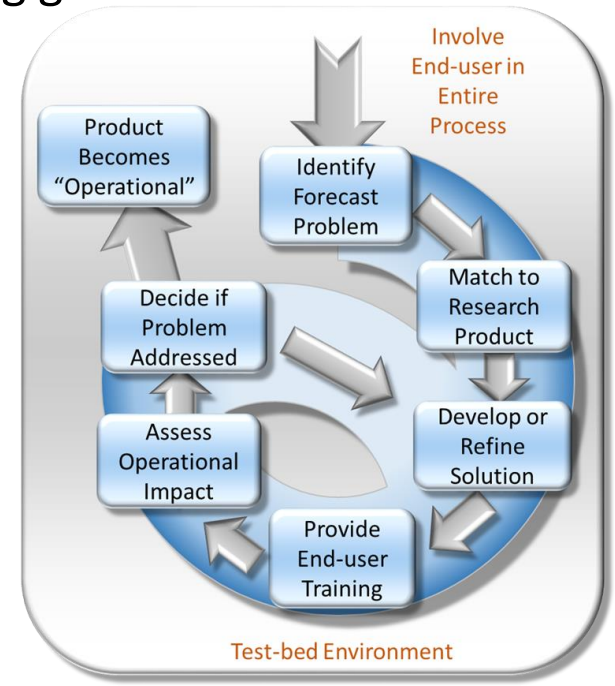
Short-term Prediction Research and Transition (SPoRT) Center

Mission: Transition unique NASA and NOAA observations and research capabilities to the operational weather community to improve short-term weather forecasts on a regional and local scale.

- Close collaboration with numerous WFOs and National Centers across the country
- SPoRT activities began in 2002, first products to AWIPS in 2003
- Co-funded by NOAA since 2009 through "proving ground" activities
- Proven paradigm for transition of research and experimental data to "operations"

Benefit:

- Demonstrate capability of NASA and NOAA experimental products to weather applications and societal benefit
- Prepares forecasters for use of data from next generation of operational weather and climate satellites



Advances in OCONUS Applications with NASA and NOAA (JPSS and GOES-R) Programs

Multispectral imagery from MODIS / VIIRS enables new products

- suite of RGB composites pioneered by EUMETSAT with SEVIRI for improved situational awareness and aviation applications
- VIIRS DNB provides unique night time viewing of clouds

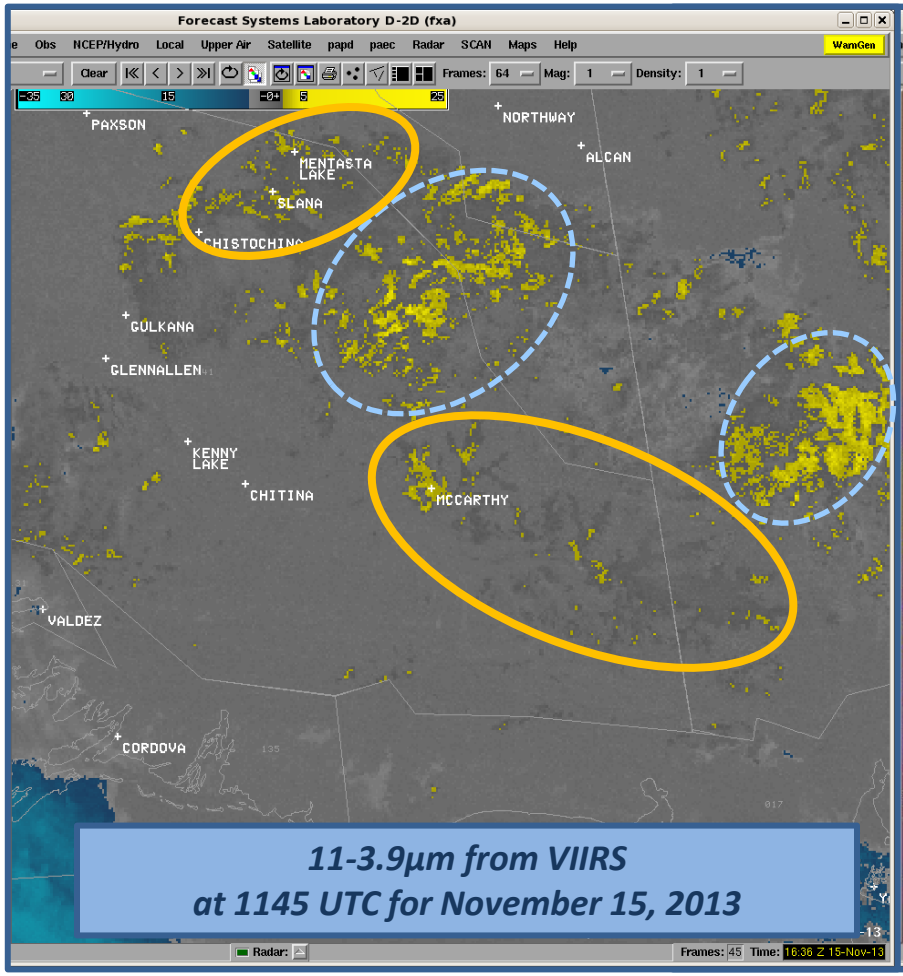
Passive microwave observations (AMSU, ATMS, GPM) on numerous polar orbiting satellites permits estimation of rain and snowfall rate products at frequent intervals at high latitudes

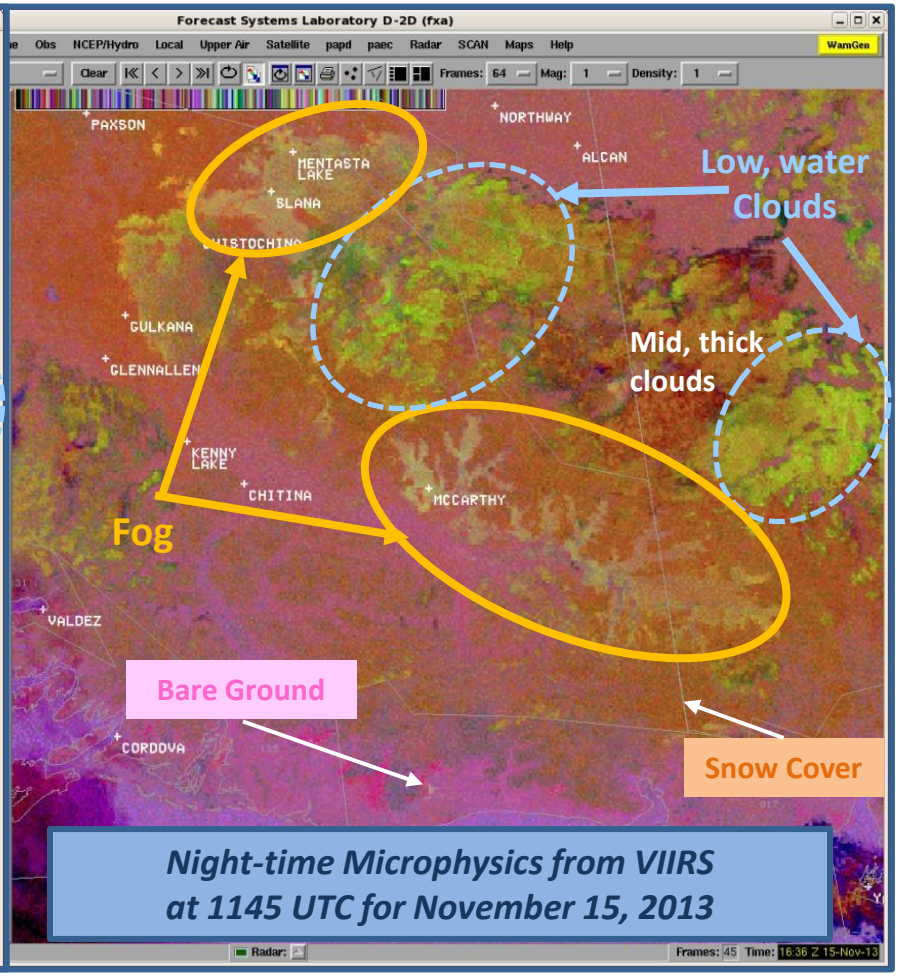
GOES-R ABI imagery provides products similar to polar-orbiting infrared data but with rapid temporal updates

- improved spatial resolution assists high latitude monitoring
- enables monitoring of rapid storm system changes

Advances in Multispectral Imagery Beyond the 11-3.9µm Product to Distinguish Low Clouds and Fog

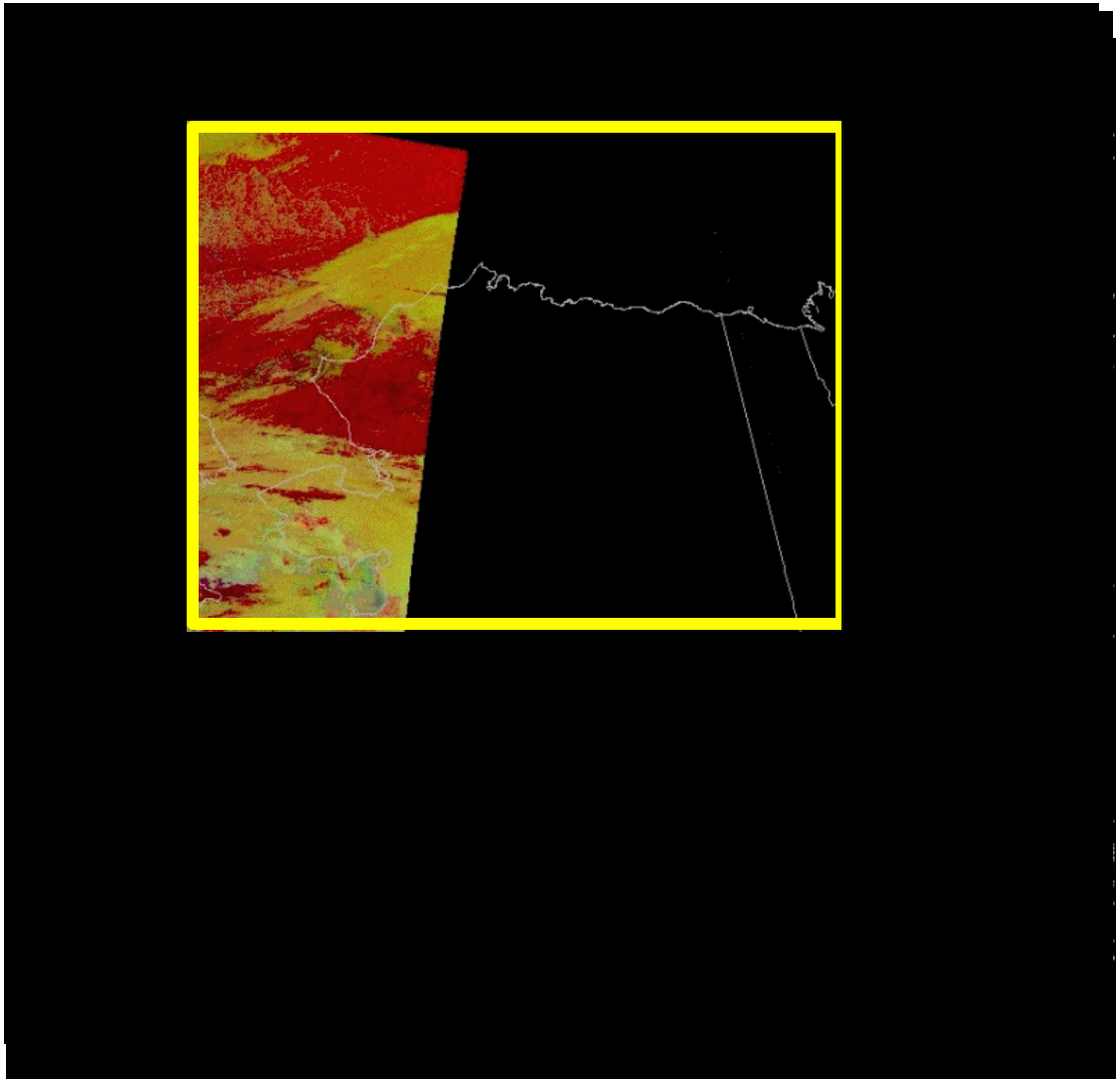
McCarthy, AK example





MODIS/VIIRS 24hr Microphysics RGB Composite for Use in Alaska

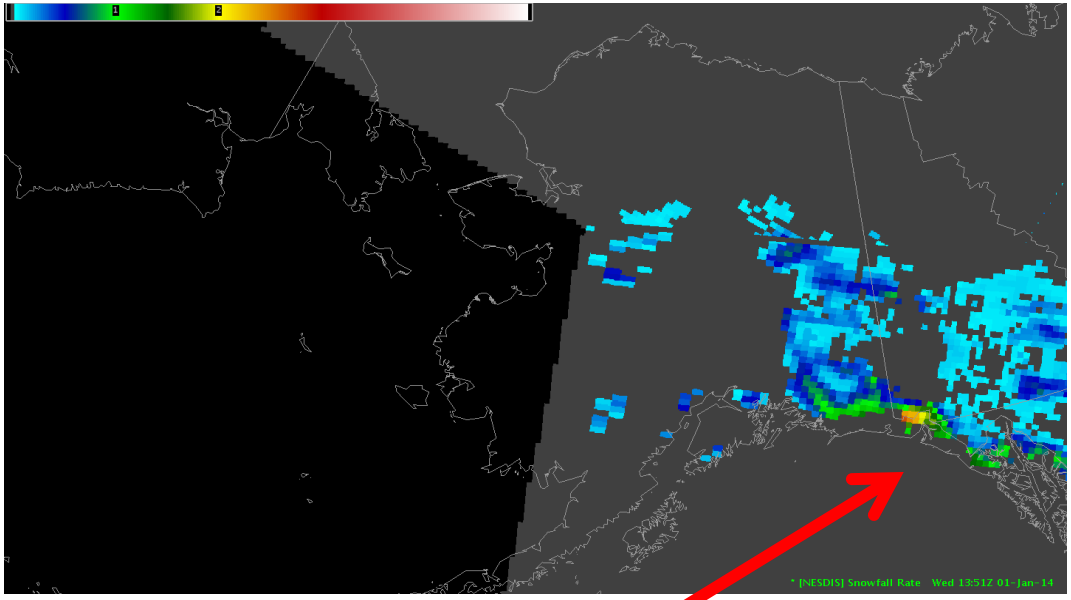
- Assessment of EUMETSAT's nighttime Microphysics RGB by Alaska forecasters leads to testing of a 24-hour Microphysics RGB.
- MODIS and VIIRS channels are limb and bias corrected to provide consistency
- Use of both satellites allows animation of imagery, at least for northern portions – particularly useful in arctic coast
- Additional international satellites would increase usage



ATMS/AMSU-MHS Snowfall Rate

- NESDIS-STAR improved analysis of frozen precipitation compared to visible and infrared as well as standard reflectivity
- Multi-channel for sensitivity through precipitation column
- Aids data sparse or beam-blocked regions
- Currently over-land product
- Enough passes for near hourly frequency

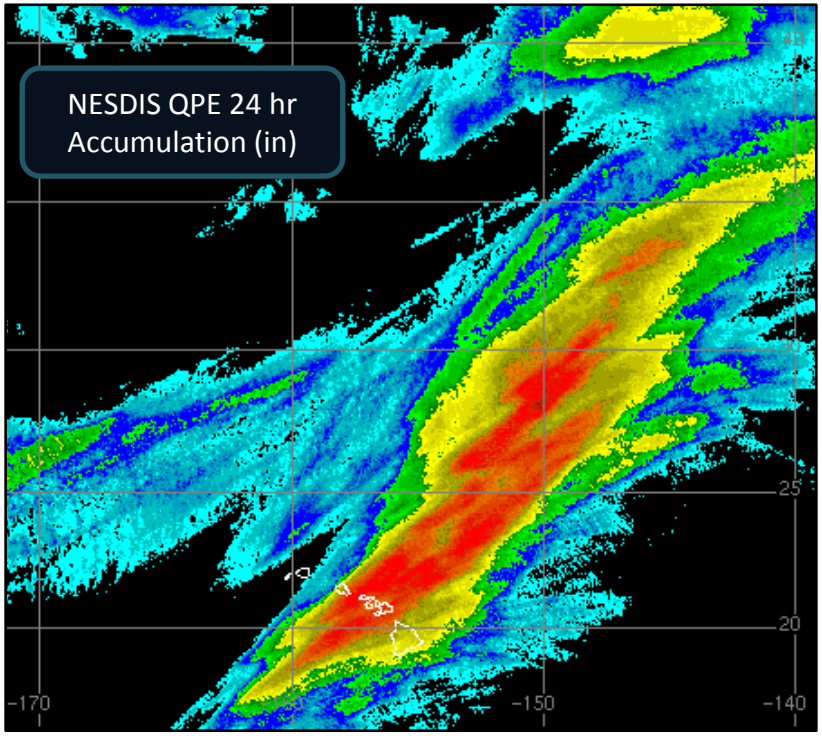
– S-NPP, POES x2, MetOp x2



Liquid water SFR of 0.2 in/hr means solid SFR of ≈2 in/hr

In-cloud snow is likely hitting the ground downstream, not at pixel locations

NESDIS Quantitative Precipitation Estimate (QPE)



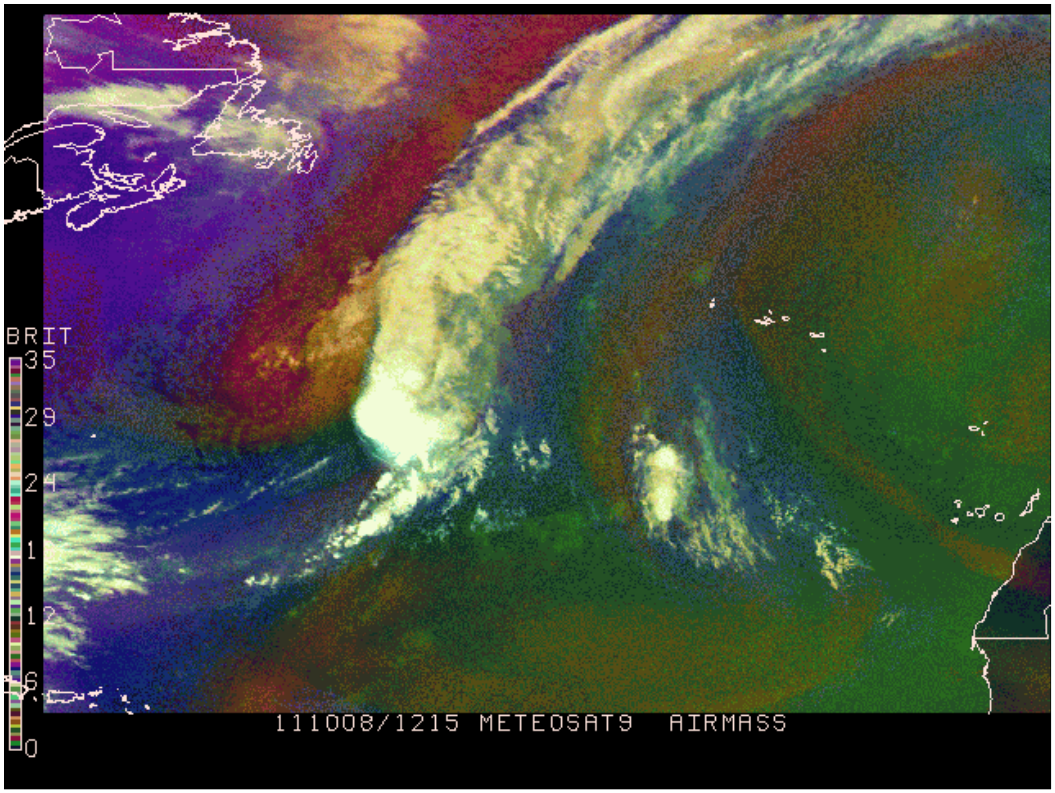
1200 UTC, 07 February 2014

- Derived from current GOES IR observations and calibrated against passive microwave rain rates.
- One 15 minute rain rate with seven accumulation products ranging from 1 hour to 7 days.
- Transitioned to WFO Honolulu in May 2014 and underwent an informal evaluation during the summer and early fall. Feedback noted QPE could be very beneficial for locations lacking radar across Pacific Region.
- Similar GOES-R ABI product complementary to direct passive microwave rain rate observations.

New Geostationary Observations

- NHC has suite of RGBs from SEVIRI to examine tropical cyclones and surrounding environment
- Interest from Puerto Rico in SEVIRI, particularly for dust
- MODIS, VIIRS, AVHRR can make some of these RGBs now for OCONUS regions
- GOES-R/-S capabilities to be seen via Himawari imager in Pacific Region

2011 Hurricane Philippe Extratropical Transition
(only 95 colors in NAWIPS display)



Advanced Satellite Applications Enabled by new NASA and NOAA satellites will lead to greatly improved nowcasting and short-term weather forecasting